

WHAT IS CLAIMED IS:

1 1. In a wireless mesh network having a first communication
2 station and at least a second communication station, an improvement
3 of apparatus for time-synchronizing communication of data between
4 the first and least second communication stations, respectively,
5 said apparatus comprising:

6 a network time register coupled to receive a time
7 reference signal of values representative of a reference time, said
8 network time register for buffering and maintaining updated values
9 of the reference time; and

10 a data formatter coupled to said network time register,
11 said data formatter for formatting the data to be communicated
12 between the first and at least second communication stations of the
13 wireless mesh network, the data, once formatted, including indicia
14 associated with the updated values of the reference time buffered
15 at said network time register.

1 2. The apparatus of claim 1 further comprising a latch
2 register coupled to said network time register, said latch register
3 for buffering latched values of the reference time buffered at said
4 network time register.

1 3. The apparatus of claim 2 wherein a trigger signal is
2 selectably applied to said latch register, and wherein the updated
3 values of the reference time are buffered at said latch register
4 and latched thereat upon application of the trigger signal to said
5 latch register.

1 4. The apparatus of claim 3 wherein the trigger signal is
2 applied to said latch register responsive to occurrence of a
3 selected event, buffering and latching at said latch register
4 event-driven responsive to the occurrence of the selected event.

1 5. The apparatus of claim 4 wherein the latched values
2 buffered at said latch register are accessible by at least a
3 selected one of the first and at least second communication
4 stations, the values accessible thereat representative of the
5 reference time at which the selected event occurs.

1 6. The apparatus of claim 1 wherein said network time
2 register forms a portion of a selected one of the first and at
3 least second communication stations and wherein the selected one of
4 the first and at least second communication stations at which said
5 network time register is formed forms a time-reference
6 communication station used by a nonselected at least one of the
7 first and at least second communication stations to be synchronized
8 thereto.

1 7. The apparatus of claim 1 wherein the data communicated
2 between the first communication station and the at least the second
3 communication station comprises packet data and wherein said data
4 formatter formats the data into data packets of which at least
5 selected ones of the data packets include the indicia associated
6 with the updated values of the reference time.

1 8. The apparatus of claim 5 further comprising a strobe
2 register coupled to said network time register, said strobe
3 register for generating the trigger signal which is selectively
4 applied to said latch register.

1 9. The apparatus of claim 8 wherein said strobe register is
2 set with a strobe value, and wherein the trigger signal is
3 generated each time in which the strobe value counts out.

1 10. The apparatus of claim 1 further comprising a clock
2 oscillator, said clock oscillator for generating the time reference
3 signal, values of which said network time register is coupled to
4 receive.

1 11. The apparatus of claim 10 further comprising interface
2 circuitry coupled to said clock oscillator and to said network time
3 register, said interface circuitry coupled to receive an
4 externally-generated master clock signal, and said interface
5 circuitry for selectively biasing the clock oscillator to alter the
6 time reference signal generated thereat.

1 12. The apparatus of claim 11 wherein said network time
2 register, said data formatter, said clock oscillator, and said
3 interface circuitry are formed at a selected one of the first
4 communication station and the at least the second communication
5 station and wherein the externally-generated master clock signal is
6 generated by an other of the first and at least second
7 communication stations, respectively.

1 13. In the wireless mesh network of claim 12, a further
2 improvement of apparatus for the other of the first and at least
3 second communication stations, said apparatus comprising an
4 extractor for extracting the indicia associated with the updated
5 values of the reference time when the data is communicated to the
6 other of the first and at least second communication stations.

1 14. The apparatus of claim 13 wherein said network time
2 register comprises a first network time register formed at the
3 selected one of the first and at least second communication
4 stations and a second time register formed at the other of the
5 first and at least second communication stations, and wherein said
6 data formatter comprises a first data formatter formed at the
7 selected one of the first and at least second communication
8 stations and a second data formatter formed at the other of the
9 first and at least second communication stations.

1 15. In a method for communicating in a wireless mesh network
2 having a first communication station and at least a second
3 communication station, an improvement of a method for time-
4 synchronizing communication of data between the first and at least
5 second communication stations, respectively, said method
6 comprising:

7 buffering and maintaining updated values of a reference
8 time responsive to reception of a time reference signal; and
9 formatting the data to be communicated between the first
10 and at least second communication stations, the data, once
11 formatted, including indicia associated with the updated values of
12 the reference time buffered during said operation of buffering.

1 16. The method of claim 15 further comprising the operation
2 of latching a buffered value of the reference time buffered during
3 said operation of buffering.

1 17. The method of claim 16 further comprising the operation
2 of selectively generating a trigger signal and wherein said
3 operation of latching is performed responsive to generation of the
4 trigger signal.

1 18. The method of claim 17 wherein said operation of
2 selectably generating the trigger signal is performed responsive to
3 occurrence of a selected event.

1 19. The method of claim 15 wherein the data to be
2 communicated between the first and at least second communication
3 stations comprises packet data and wherein said operation of
4 formatting comprises adding the indicia associated with the updated
5 values of the reference time to at least select ones of data
6 packets of the packet data.

1 20. The method of claim 19 wherein said operations of
2 buffering and formatting are performed at the first communication
3 station and wherein said method further comprises the operations
4 of:

5 sending the packet data to the second communication
6 station;

7 extracting the indicia associated with the updated values
8 of the reference time from the at least selected ones of the data
9 packets; and

10 using the indicia extracted during said operation of
11 extracting to synchronize the second communication station to the
12 reference time buffered during said operation of buffering and
13 maintaining.